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EXAMINER	
JAMAL, ALEXANDER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/672,812	Applicant(s) WALL, BRIAN G.	
	Examiner Alexander Jamal	Art Unit 2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to **claims 1-19** have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 1-5** rejected under 35 U.S.C. 103(a) as being anticipated by Schopfer (5249226) and further in view of Zhou (6178241).

a. **Claim 1:** Schopfer discloses an arrangement for feeding current into a subscriber loop comprising:

i. An output to impress a voltage across the loop conductors (reference 12, Fig. 1) that is output from a current amplifier. The amplifier will generate a current thru R_L (reference 18, Fig. 1) with R_L being the load across the subscriber loop. Since Voltage=Current*Resistance, a differential voltage will be impressed across the conductors of the loop.

ii. A control element that regulates the magnitude of loop current to a target value. The target value is set depending on load level on the subscriber loop (Col 1, lines 54-65). Since the number of CPE's active in the subscriber loop determine the load, the current magnitude is regulated in response to a change in the number of active CPE's in the subscriber loop.

However, Schopfer does not disclose deriving a data element indicative of a rate of change of current in the loop, or processing said element to detect a change in the number of active CPEs in the loop.

Zhou teaches a system (Fig. 4) to detect a load on a subscriber loop based upon the rate of change of current measured in the loop. He discloses sampling the voltage across the loop and comparing it to the current in the loop to detect certain load values (Col 11 lines 34-62). The voltage and current are sampled every 0.25 ms. The rate of change in current (data element) is 'sampled current' divided by 0.25ms (ie. the current has changed by 'x' amount in 0.25 ms). After a certain amount of change is detected within the sampling period (ie. rate of change) the system enters into a debounce mode for a predetermined number of consecutive samples. In this state the system is examining the rate of change (change in current every 0.25ms) to ensure the rate of change is close to zero (the current draw remains the same for the debounce period) (Col 11 line 63 to Col 12 line 41). Zhou teaches the advantage that this method of load detection is adaptable to vary the sampling rate of the measured current to change the on/offhook detection speed (for example, to ensure an on/offhook detection within the industry

standard 2ms) (Col 12 lines 12-19). It would have been obvious to one of ordinary skill in the art at the time of this application to implement Zhou's current sampling system to derive and process the rate of change of current in use to determine a change in the load (number of CPE's offhook) for the advantage that the sampling speed may be varied in order to ensure accurate on/offhook detection (including debouncing) within a predetermined amount of time.

b. **Claim 2:** Schopfer's apparatus contains multiple sets of parameters for current regulation based upon varying load levels on the subscriber loop. A second CPE going offhook on a subscriber loop would create a change in the load, and Schopfer's control element would change the loop current regulation value accordingly (Col 1, line 66 to Col 2, line 29).

c. **Claim 3:** Schopfer's apparatus regulates the loop current in two ranges of loop load levels. The apparatus would regulate in the first range for a lower load level (ie. 1 CPE in use) and regulate in the second range that extends above the higher load level (ie. a 2nd CPE goes into use) (ABSTRACT).

d. **Claim 4:** Schopfer's apparatus will regulate current to a target based upon the load in the loop. At least 1 (designated 'A' in applicant's claim) active CPE would constitute a change to the higher load level and the control element would shift to the higher range of target loop current values (ABSTRACT).

e. **Claim 5:** Schopfer describes his apparatus as being used to control the feed current to equipment on a subscriber's loop (Col 1 lines 12-23). The equipment is

represented by R.sub.L and located across the tip and ring of the subscriber loop (reference 18, Fig. 1).

4. **Claims 6-8** rejected under 35 U.S.C. 103(a) as being unpatentable over Schopfer (5249226) and Zhou (6178241) as applied to claims 1-5 above, and further in view of Jakab (5333196).

a. **Claim 6:** Schopfer and Zhou teach applicant's claims 1-5 but do not mention the control element receiving an input control signal based upon the current in the tip conductor.

Jakab teaches the design of an improved current limiting battery feed arrangement that meets all the requirements (AC impedance, DC resistance, protection from lightning strikes on the loop) for a circuit to limit current in a subscriber loop (Col 1, lines 33-52). In his design he uses at least one control input relative to the magnitude of the tip current: the voltage across a series resistor (reference 8, FIG. 4; Col 5, line 67 to Col 6, line 9). It would have been obvious to one of ordinary skill in the art at the time of this application to use at least one control input relative to the magnitude of the tip current.

b. **Claim 7:** Jakab further teaches the use of a second control input for receiving a second control signal based upon the current in the ring conductor: the voltage across a series resistor (reference 70, FIG. 4; Col 5, line 67 to Col 6, line 9). Therefore it would have been obvious to one of ordinary skill in the art at the time of this application to use a

first and second control input relative to the magnitude of the tip and ring current respectively.

c. **Claim 8:** Jakab's device comprises:

i. A power supply and input for the power supply to the feed arrangement. (Shown as the –52V and ground in FIG. 4).

ii. Generating an output control signal from an op-amp based upon the first and second input control signals. (FIG 4: Op-amp 80 outputs a reference signal based upon values obtained from resistors 8, 70) (Col 5, line 67 to Col 6, line 9).

iii. Outputting the control signal (reference 94, FIG. 4; Col 5, line 67 to Col 6, line 9).

iv. Letting the output signal be suitable to control the output voltage of the power supply in order to set the loop current to a pre-selected target value (Col 6, lines 4-20).

5. **Claims 9-17** rejected under 35 U.S.C. 103(a) as being unpatentable over Schopfer (5249226), and further in view of Jakab (5333196) and Zhou (6178241).

a. **Claim 9:** Schopfer discloses:

i. An output to impress a voltage across the loop conductors is shown in Schopfer's (reference 12, Fig. 1) current amplifier. The amplifier will generate a current thru R_L (reference 18, Fig. 1) with R_L being the load across the subscriber loop. Since Voltage=Current*Resistance, a differential voltage will be impressed across the conductors of the loop.

ii. A control element that regulates the magnitude of loop current to a target value. The target value is set depending on load level on the subscriber loop (Col 1, lines 54-65). Since the number of CPE's active in the subscriber loop determine the load, the current magnitude is regulated in response to a change in the number of active CPE's in the subscriber loop.

But Schopfer does not mention:

i. A power supply

ii. An input connected to the power supply

iii. The control unit deriving a data element indicative of a rate of change of current in the loop, or processing said element to detect a change in the number of active CPEs in the loop.

Jakab teaches the design of an improved current limiting battery feed arrangement that meets all the requirements (AC impedance, DC resistance, protection from lightning strikes on the loop) for a circuit to limit current in a subscriber loop (Col 1, lines 33-52). Jakab's design includes a power supply and input for the power supply to the feed arrangement (Shown as the –52V and ground in FIG. 4). It would have been obvious to one of ordinary skill in the art at the time of this application to include a power supply and input connected to the feed arrangement in order to provide power.

Zhou teaches a system (Fig. 4) to detect a load on a subscriber loop based upon the rate of change of current measured in the loop. He discloses sampling the voltage across the loop and comparing it to the current in the loop to detect certain load values (Col 11 lines 34-62). The voltage and current are sampled every 0.25 ms. The rate of change in current (data element) is 'sampled current' divided by 0.25ms (ie. the current has changed by 'x' amount in 0.25 ms). After a certain amount of change is detected within the sampling period (ie. rate of change) the system enters into a debounce mode for a predetermined number of consecutive samples. In this state the system is examining the rate of change (change in current every 0.25ms) to ensure the rate of change is close to zero (the current draw remains the same for the debounce period) (Col 11 line 63 to Col 12 line 41). Zhou teaches the advantage that this method of load detection is adaptable to vary the sampling rate of the measured current to change the on/offhook detection speed (for example, to ensure an on/offhook detection within the industry standard 2ms) (Col 12 lines 12-19). It would have been obvious to one of ordinary skill in the art at the time of this application to implement Zhou's current sampling system to derive and process the rate of change of current in use to determine a change in the load (number of CPE's offhook) for the advantage that the sampling speed may be varied in order to ensure accurate on/offhook detection (including debouncing) within a predetermined amount of time.

b. Claim 10: Jakab's device comprises:

i. Generating an output control signal from the control element (Col 5, line 67 to Col 6, line 9).

ii. Outputting the control signal (reference 94, FIG. 4; Col 5, line 67 to Col 6, line 9) to the power supply.

iii. Letting the output signal be suitable to control the output voltage of the power supply in order to set the loop current to a pre-selected target value (Col 6, lines 4-20).

c. **Claim 11:** Schopfer's apparatus contains multiple sets of parameters for current regulation based upon varying load levels on the subscriber loop. A second CPE going offhook on a subscriber loop would create a change in the load, and Schopfer's control element would change the loop current regulation value accordingly (Col 1, line 66 to Col 2, line 29).

d. **Claim 12:** Schopfer's apparatus regulates the loop current in two ranges of loop load levels. The apparatus would regulate in the first range for a lower load level (ie. 1 CPE in use) and regulate in the second range that extends above the higher load level (ie. a 2nd CPE goes into use) (ABSTRACT).

e. **Claim 13:** Schopfer's apparatus will regulate current to a target based upon the load in the loop. At least 1 (designated 'A' in applicant's claim) active CPE would constitute a change to the higher load level and the control element would shift to the higher range of target loop current values (ABSTRACT).

f. **Claim 14:** Schopfer describes his apparatus as being used to control the feed current to equipment on a subscriber's loop (Col 1 lines 12-23). The equipment is represented by R.sub.L and located across the tip and ring of the subscriber loop (reference 18, Fig. 1).

g. **Claim 15:** Jakab teaches the design of an improved current limiting battery feed arrangement that meets all the requirements (AC impedance, DC resistance, protection from lightning strikes on the loop) for a circuit to limit current in a subscriber loop (Col 1, lines 33-52). In his design he uses at least one control input relative to the magnitude of the tip current: the voltage across a series resistor (reference 8, FIG. 4; Col 5, line 67 to Col 6, line 9). It would have been obvious to one of ordinary skill in the art at the time of this application to use at least one control input relative to the magnitude of the tip current.

h. **Claim 16:** Jakab further teaches the use of a second control input for receiving a second control signal based upon the current in the ring conductor: the voltage across a series resistor (reference 70, FIG. 4; Col 5, line 67 to Col 6, line 9). Therefore it would have been obvious to one of ordinary skill in the art at the time of this application to use a first and second control input relative to the magnitude of the tip and ring current respectively.

i. **Claim 17:** In Jakab's design, an op-amp generates an output control signal based upon the first and second input control signals. (FIG 4: Op-amp 80 outputs a reference signal based upon values obtained from resistors 8, 70) (Col 5, line 67 to Col 6, line 9).

6. **Claim 18** rejected under 35 U.S.C. 103(a) as being anticipated by Schopfer (5249226) and further in view of Zhou (6178241).

a. **Claim 18**: Schopfer discloses a method comprising:

i. Regulating the magnitude of loop current to a target value. The target value is set depending on load level on the subscriber loop (Col 1, lines 54-65). Since the number of CPE's active in the subscriber loop determine the load, the applicant's Claim 18 is anticipated by Schopfer.

ii. Regulating the loop current into a second range of values based upon a 2^{nd} CPE going active. In his method, the apparatus would regulate in the first range for a lower load level (ie. 1 CPE in use) and regulate in the second range that extends above the higher load level (ie. a 2^{nd} CPE goes into use) (ABSTRACT).

However, Schopfer does not disclose deriving a data element indicative of a rate of change of current in the loop, or processing said element to detect a change in the number of active CPEs in the loop.

Zhou teaches a system (Fig. 4) to detect a load on a subscriber loop based upon the rate of change of current measured in the loop. He discloses sampling the voltage across the loop and comparing it to the current in the loop to detect certain load values (Col 11 lines 34-62). The voltage and current are sampled every 0.25 ms. The rate of change in current (data element) is 'sampled current' divided by 0.25ms (ie. the current has changed by 'x' amount in 0.25 ms). After a certain amount of change is detected within the sampling period (ie. rate of change) the system enters into a debounce mode

for a predetermined number of consecutive samples. In this state the system is examining the rate of change (change in current every 0.25ms) to ensure the rate of change is close to zero (the current draw remains the same for the debounce period) (Col 11 line 63 to Col 12 line 41). Zhou teaches the advantage that this method of load detection is adaptable to vary the sampling rate of the measured current to change the on/offhook detection speed (for example, to ensure an on/offhook detection within the industry standard 2ms) (Col 12 lines 12-19). It would have been obvious to one of ordinary skill in the art at the time of this application to implement Zhou's current sampling system to derive and process the rate of change of current in use to determine a change in the load (number of CPE's offhook) for the advantage that the sampling speed may be varied in order to ensure accurate on/offhook detection (including debouncing) within a predetermined amount of time.

7. **Claim 19** rejected under 35 U.S.C. 103(a) as being anticipated by Schopfer (5249226) and further in view of Zhou (6178241).

a. Claim 19: Schopfer discloses an apparatus comprising:

i. An output to impress a voltage across the loop conductors (reference 12, Fig. 1) that is output from a current amplifier. The amplifier will generate a current thru R_L (reference 18, Fig. 1) with R_L being the load across the subscriber loop. Since Voltage=Current*Resistance, a differential voltage will be impressed across the conductors of the loop.

ii. A control element that regulates the magnitude of loop current to a target value. The target value is set depending on load level on the subscriber loop (Col 1, lines 54-65). Since the number of CPE's active in the subscriber loop determine the load, the current magnitude is regulated in response to a change in the number of active CPE's in the subscriber loop.

However, Schopfer does not disclose deriving a data element indicative of a rate of change of current in the loop, or processing said element to detect a change in the number of active CPEs in the loop.

Zhou teaches a system (Fig. 4) to detect a load on a subscriber loop based upon the rate of change of current measured in the loop. He discloses sampling the voltage across the loop and comparing it to the current in the loop to detect certain load values (Col 11 lines 34-62). The voltage and current are sampled every 0.25 ms. The rate of change in current (data element) is 'sampled current' divided by 0.25ms (ie. the current has changed by 'x' amount in 0.25 ms). After a certain amount of change is detected within the sampling period (ie. rate of change) the system enters into a debounce mode for a predetermined number of consecutive samples. In this state the system is examining the rate of change (change in current every 0.25ms) to ensure the rate of change is close to zero (the current draw remains the same for the debounce period) (Col 11 line 63 to Col 12 line 41). Zhou teaches the advantage that this method of load detection is adaptable to vary the sampling rate of the measured current to change the on/offhook detection speed (for example, to ensure an on/offhook detection within the industry

standard 2ms) (Col 12 lines 12-19). It would have been obvious to one of ordinary skill in the art at the time of this application to implement Zhou's current sampling system to derive and process the rate of change of current in use to determine a change in the load (number of CPE's offhook) for the advantage that the sampling speed may be varied in order to ensure accurate on/offhook detection (including debouncing) within a predetermined amount of time.

Conclusion:

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 703-305-3433. The examiner can normally be reached on M-F 8AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 703-305-4708. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9315 for After Final communications.

DUC NGUYEN
PRIMARY EXAMINER

AJ
February 17, 2004